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FOREWORD

This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned**.

GEOMETRICAL AND MECHANICAL DRAWING

GCE Ordinary Level

Paper 7040/01

Plane and Solid Geometry

General comments

Centres are to be congratulated on the manner in which scripts were packaged so that the vast majority arrived in the self seal plastic envelopes in mint condition. Regrettably, though, several Centres packaged their candidates scripts rather too casually so that they arrived badly creased and from one Centre torn.

It was noted that a number of candidates had used coloured crayons, biro and or ink. Examiners would suggest that Centres encourage their candidates to restrict all their work to pencil for this examination.

Once again some candidates fully dimensioned their answers thereby losing valuable time that could have been usefully spent on other questions. Centres should ensure that their candidates realise that only dimensions specifically asked for should be included on scripts for this paper.

Whilst there were a small number of candidates who managed little more than to copy out the questions as set, it was pleasing to see an increase in the number of better scripts the quality of line and understanding of the questions being a credit to both the candidates and their Centres.

Comments on specific questions

Section 1

Plane geometry

Question 1

(a) A very popular question with most candidates drawing the metal plate to the correct dimensions. Unfortunately many ignored the necessary geometrical constructions preferring trial and error methods. For this type of question Examiners expect the centre of BCD to be determined before it is drawn and the 90° angle AFE should have been positioned within a semi-circle on AE after striking off the 60 mm length EF.

(b) Although virtually all candidates attempting this part used a 7:5 ratio many found a linear increase of length rather than a 7:5 increase in area. Having determined the required increase correctly it was surprising how many failed to complete the new figure using radial and parallel lines.

Question 2

(a) Whilst there were several spirals and other curves the vast majority of candidates who tackled this question realised that a cycloid would be generated. Several candidates lost accuracy and therefore marks by only using eight generators. Examiners expect a minimum of twelve generators to be used for this type of question if candidates are to score full marks.

The most common error was dividing the distance travelled (209 mm) into 12 to determine the centre of the rolling rubber wheel as it travelled down to the stop position instead of marking off 1/12th of the wheel's circumference.

(b) Very few candidates who drew the curve correctly failed to identify the generated curve as a cycloid.

(c) Only a handful of scripts included a construction for the tangent the majority preferring to simply draw one at the specified point on their curve. Centres need to stress to their candidates that it's the construction lines in this examination paper that are awarded the majority of marks.

Question 3

The semi-ellipse caused few problems other than several candidates determined insufficient points on the curve before lining in.

Whilst the majority of candidates constructed a parabola, many did so within a rectangle when they should have determined the directrix and used the fact that any point on a parabola is equi-distant from its focus and directrix to construct the curve BVC. Many candidates continued and drew, but did not construct the tangent and were consequently penalised.

Section 2

Solid geometry

Question 4

A straightforward question that caused few problems in laying out or for the basic construction for the surface development of the conical lampshade.

Far too many candidates ignored the given joint preferring to use one of their own choice. The main error in this question was due to many candidates failure to project heights across to a true length line before transferring to the development leading to inaccuracies. Nevertheless a popular question with a large number of correct solutions.

Question 5

Another popular question, surprisingly a handful of candidates presented a dimensional orthographic as set or an oblique projection instead of the required isometric.

Several candidates lost marks by not positioning corner C to the front of their drawing. Others had difficulty, generally because they failed to 'box-in' initially, with the rear slope. Although several candidates omitted the 10 mm diameter button at the top of the case, the detail causing the greatest problem was the hexagonal bezel. Invariably because candidates did not construct a 70 mm A/F hexagon prior to starting the isometric, preferring to guess sizes often with disastrous results. However, a number of excellent solutions were seen.

Question 6

(a) Candidates tackling this question appeared to have little difficulty in drawing the given views correctly.

(b) Common errors when attempting to project an auxiliary elevation included:

- Drawing an isometric projection instead of an auxiliary view.
- Projecting from the original elevation instead of the plan view for the auxiliary elevation.
- Drawing an auxiliary elevation at the wrong angle, mainly when viewed at 30° or 45° rather than at 60° as asked for in the question.
- Failure to include the bevel.
- Insufficient plots, or indeed none, when projecting the R60 and R67 arcs to determine the curved bracket support.

Generally, however, most candidates were able to project a creditable auxiliary view.

Question 7

(a) The least popular question with the majority of candidates going no further than the given view.

(b) Many candidates drew two spheres in the plan view not realising that one was in fact a cylinder.

(c) Very few correct solutions with many candidates simply drawing in a freehand curve for the intersection between cylinder and sphere.

A series of cutting planes is the most straightforward method for solving this type of question. Many candidates need to develop this technique thereby enhancing prospects for this aspect of the syllabus.

Question 8

(a) Traditionally not a popular section of the syllabus. Those candidates tackling this question were generally able to draw the given views correctly although there were several out of scale plan views.

(b) The majority of answers to this part were correct but a number of candidates caused themselves difficulties because of inadequate labelling of the corners a, b, c, d and e.

(c) A handful of correct solutions. Many candidates mixed up adjacent sides, this resulted in a distorted final shape.

Paper 7040/02
Drawing (Mechanical)

Comments on specific questions

Section 1

The freehand sketches were generally of a reasonably good standard. Most candidates are giving this part of the syllabus the necessary attention. The majority of candidates correctly drew the required freehand sketch, from the given orthographic views.

A few candidates made freehand sketches of the given orthographic views.

Section 2

Most candidates answered this section reasonably well.

Front elevation

This view required seven component parts to be assembled, and be drawn in section. The majority of the candidates assembled the components in their correct relative positions. There was confusion amongst some candidates as to whether the valve cover and the gland nut should be sectioned.

A common mistake was to draw the gland nut flush on top of the valve cover. There should have been a minimum gap of 2 mm between the two components.

End elevation

Generally well answered, but the majority of the candidates omitted the 10 mm diameter hole ellipse in the M30 threaded hole.

Plan

This was a simple view and was well answered by the candidates who attempted it.

Crass Hatching was not of a good standard. Many candidates drew lines at 45° irrespective to the relative position of the component in the sectional view.

Dimensioning of the drawing was not of a suitable standard, and frequently did not conform to British Standard. The dimensioning of components is an important part of an engineering drawing.

It would appear that many candidates place little importance in the dimensioning of an engineering drawing.

The general standard of line definition and the quality of the drawings were good in this year's solution to the question.